

Amendment and Response

Applicant: LeRoy A. Kuta et al.

Serial No.: 09/883,144

Filing Date: June 15, 2001

Docket No.: 56731USA9A (M120.137.101)

Title: METHOD AND APPARATUS FOR AUTOMATICALLY APPLYING A FLYING SPLICING TAPE TO A ROLL OF SHEET MATERIAL

2. The method of claim 1, wherein lifting a portion of the outer-most layer includes establishing a spacing to allow cutting of the outer-most layer.
3. The method of claim 1, further comprising:
moving the leading edge a further distance from the defined application line following the cutting step to provide spacing for applying the splicing tape.
4. The method of claim 3, wherein the step of moving the leading edge a further distance includes:
engaging the outer-most layer adjacent the leading edge with an engagement mechanism;
maintaining a position of the outer-most layer against a remainder of the roll downstream of a point of an interface between the engagement mechanism and the outer-most layer with a hold down device; and
maneuvering the engagement mechanism away from the defined application line, the hold down device maintaining a tension in the outer-most layer as the leading edge is maneuvered.
5. The method of claim 1, wherein following the cutting step, the outer-most layer is defined by an unwound section, including the leading edge, and a wound section extending from the unwound section to a second outer-most layer otherwise wound to a remainder of the roll, and further wherein the defined application line is at a transition of the outer-most layer to the second outer-most layer.
6. The method of claim 1, wherein the step of applying a splicing tape includes applying the splicing tape straight across the roll.
7. The method of claim 6, wherein the splicing tape is applied substantially parallel to an axis of the roll.

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8. The method of claim 6, wherein the splicing tape is applied at an angle relative to an axis of the roll.
9. The method of claim 1, wherein the splicing tape has a relatively uniform width and a split line, and further wherein the step of applying the splicing tape includes substantially centering the split line relative to the defined application line.
10. The method of claim 1, wherein the splicing tape has a relatively uniform width, and further wherein the splicing tape is applied such that upon subsequent adhering of the leading edge, approximately one-third of the splicing tape width is covered by the outer-most layer.
11. The method of claim 1, further comprising:
providing a taping device for applying the splicing tape; and
providing a cutting mechanism for cutting the outer-most layer;
wherein the taping device is mechanically coupled to the cutting mechanism such that a spatial position of the cutting mechanism relative to a spatial position of the taping device is known.
12. The method of claim 1, wherein the splicing tape includes an outer tape element having an adhesive on an outer surface thereof and a release liner placed over the adhesive, the method further comprising:
removing at least a section of the release liner after applying the splicing tape to the wound portion of the roll.
13. The method of claim 12, further comprising:
providing a taping device including a tape head and a liner removal device; and
directing the taping device across a width of the roll to apply the splicing tape with the tape head and remove at least a section of the release liner with the liner removal device with a single pass of the taping device.

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14. The method of claim 1, wherein the roll of sheet material is defined by a first side and a second side, and further wherein the step of applying the splicing tape includes extending the splicing tape to the second side, the method further comprising:

sensing a location of the second side;

positioning a tape cutter at the second side of the roll based upon the sensed location; and

cutting the splicing tape with the tape cutter to a defined location relative to the roll such that a trailing edge of the splicing tape is substantially aligned with the second side of the roll.

15. The method of claim 14, wherein the splicing tape is applied by a taping device including a placement roller, and wherein the step of applying the splicing tape further includes:

sensing a location of the first side;

aligning the placement roller with the first side of the roll based upon the sensed location of the first side; and

prompting the taping device to apply the splicing tape such that a leading end of the splicing tape is substantially aligned with the first side of the roll.

16. The method of claim 1, wherein the step of adhering a leading edge of the roll to an outer surface of the splicing tape includes passing a roller over the leading edge to press the leading edge against the outer surface of the splicing tape.

17. The method of claim 1, further comprising:

sensing a spatial location of the outer-most layer before the step of lifting the outer-most layer.

18.(Amended) An apparatus for applying a splicing tape to a roll of sheet material, the apparatus comprising:

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a sheet engagement mechanism configured to engage and maneuver an outer-most layer of the roll;

a sheet cutter configured to cut the outer-most layer of the roll across a width thereof; and

a taping device including a tape head configured to apply a splicing tape to the roll;

wherein the sheet engagement mechanism, the sheet cutter and the taping device are connected to one another at known spatial locations such that the tape head applies the splicing tape along a tape line corresponding with a cut line provided by the sheet cutter, the apparatus being adapted to maintain engagement between the outer-most layer of the roll and the sheet engagement mechanism following a cutting operation by the sheet cutter.

19. The apparatus of claim 18, wherein the tape head is configured to apply a strip of splicing tape along a defined tape application line, and further wherein connection of the sheet engagement mechanism, the sheet cutter and the taping mechanism is configured such that the sheet cutter cuts an outer-most layer of the roll, otherwise lifted from a remainder of the roll by the sheet engagement mechanism, to form a leading edge that is spatially alignable with the defined tape application line.

20. The apparatus of claim 18, wherein the sheet material cutter is directly coupled to the sheet material engagement mechanism.

21. The apparatus of claim 20, wherein the combination sheet material engagement mechanism and cutter are configured to be moveable relative to the tape head.

22. The apparatus of claim 20, wherein the combination sheet material engagement mechanism and cutter are transitionable from a first position, in which the sheet material cutter is aligned with a tape application line defined by the tape head, to a second position in which the sheet cutter is spaced from the tape application line.

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23. The apparatus of claim 22, further comprising:
an actuator for moving the combination sheet material engagement mechanism and cutter
from the first position to the second position.
24. The apparatus of claim 22, further comprising:
a frame maintaining the taping device; and
a linkage connecting the combination sheet material engagement mechanism and cutter to
the frame;
wherein the linkage directs the combination sheet material engagement mechanism and
cutter between the first and second positions.
25. The apparatus of claim 22, further comprising:
a hold down device connected to and spaced from the combination sheet material
engagement mechanism and cutter, the hold down device configured to remain
stationary as the combination sheet material engagement mechanism and cutter is
transitioned from the first position to the second position.
26. The apparatus of claim 25, wherein the hold down device includes a plurality of spring-
loaded rollers.
27. The apparatus of claim 18, wherein the sheet material engagement mechanism includes a
vacuum source.
28. The apparatus of claim 18, wherein the sheet cutter and the tape head are configured to
cut sheet material and apply tape, respectively, along parallel lines.
29. The apparatus of claim 18, wherein the taping device further includes a track for guiding
the tape head across a defined path.

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30. The apparatus of claim 18, wherein the tape head includes:
a supply reel for maintaining a roll of splicing tape; and
a placement roller for applying a strip of the splicing tape to the roll.
31. The apparatus of claim 30, wherein the splicing tape includes a release liner releasably secured to an outer, adhesive-bearing surface of an outer tape element, and wherein the taping device further includes:
a liner removal mechanism for removing at least a portion of the release liner from the outer tape element, the liner removal mechanism being positioned behind the placement roller such that the taping mechanism is capable of removing at least a portion of the release liner immediately after applying the splicing tape.
32. The apparatus of claim 31, wherein the liner removal mechanism includes a take-up reel.
33. The apparatus of claim 18, wherein the taping device further includes a tape cutter for cutting the splicing tape, the tape cutter being positioned adjacent the tape head such that the splicing tape can be cut immediately after being applied to the roll.
34. The apparatus of claim 33, wherein the roll of the sheet material is defined by a first side and a second side, the splicing tape being applied from the first side to the second side, the taping device further comprising:
a roll side sensor for sensing the first side and the second side locations;
wherein the tape cutter is positionable based upon a signal from the roll side sensor.
35. The apparatus of claim 34, wherein applying of the splicing tape by the tape head is based upon a signal from the roll side sensor indicating a location of the first side of the roll.
36. The apparatus of claim 33, wherein the tape cutter includes a rotary cutter.

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37. The apparatus of claim 36, wherein the rotary cutter is radially maneuverable relative to the tape head.
38. The apparatus of claim 36, wherein the tape head includes a placement roller for placing the splicing tape onto the roll, wherein the taping device further includes:
a take-up reel for removing a portion of a release liner from the splicing tape;
wherein the rotary cutter is positioned between the placement roller and the take-up reel relative to a tape path defined for the splicing tape.
39. The apparatus of claim 18, wherein the taping device further includes a press down roller for pressing a leading edge of sheet material against an outer surface of splicing tape otherwise applied to the roll by the tape head.
40. The apparatus of claim 18, further comprising:
a roll sensor for sensing a spatial position of the roll relative to the sheet material engagement mechanism.
41. The apparatus of claim 18, wherein the sheet cutter includes a rotary sheet cutter.
42. A method of automatically applying a splicing tape to a roll of sheet material defining a width and including an outer-most layer, the method comprising:
establishing an imaginary application line extending transversely along a circumference of the roll;
lifting the outer-most layer away from a remainder of the roll in a region of the application line;
cutting the outer-most layer to form a leading edge, the cut being made such that the leading edge is radially alignable with the application line;
applying the splicing tape to a wound portion of the roll along the application line, the splicing tape extending across at least a portion of the width of the roll and the

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leading edge remaining spaced from the wound portion as the splicing tape is applied; and

adhering the leading edge to an outer surface of the splicing tape such that the outer-most layer covers a first portion of the splicing tape and a second portion of the splicing tape remains exposed.

43. The method of claim 42, wherein establishing an application line includes:
- providing a sheet cutter capable of cutting along a spatial cut line;
 - providing a taping device capable of applying a strip of splicing tape along a spatial tape application line; and
 - coupling the sheet cutter and the taping device to one another such that the spatial cut line is radially aligned with the spatial tape application line.